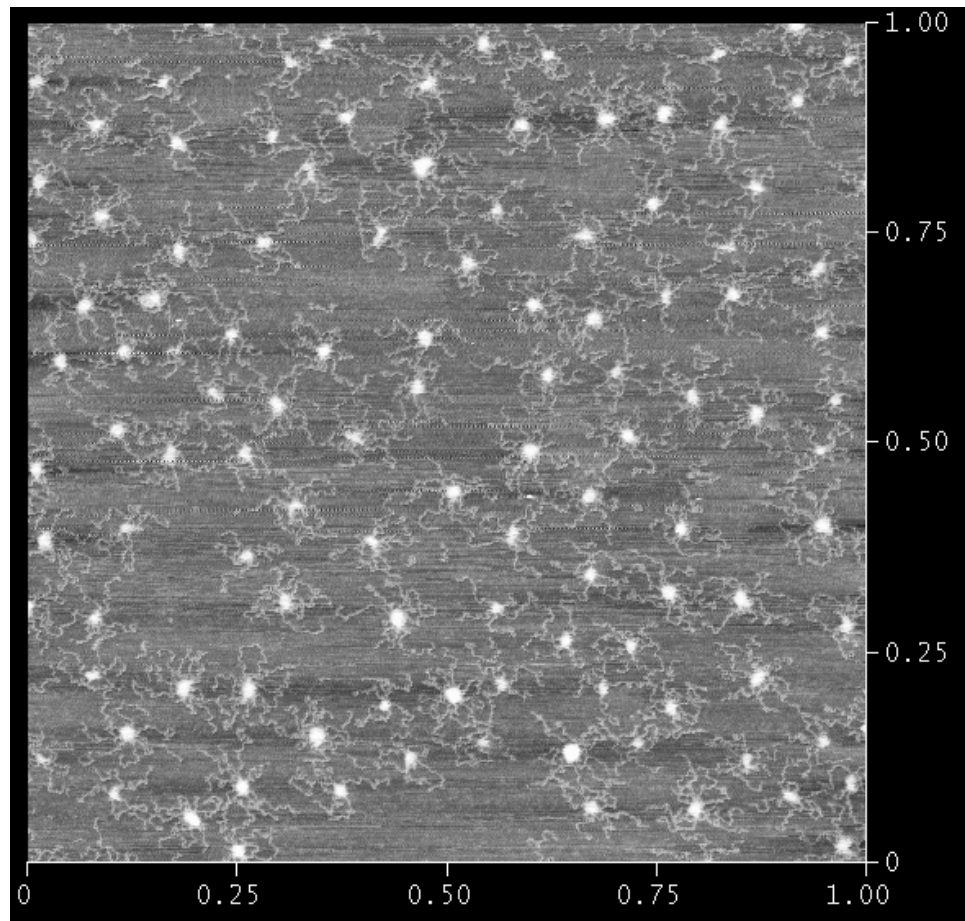
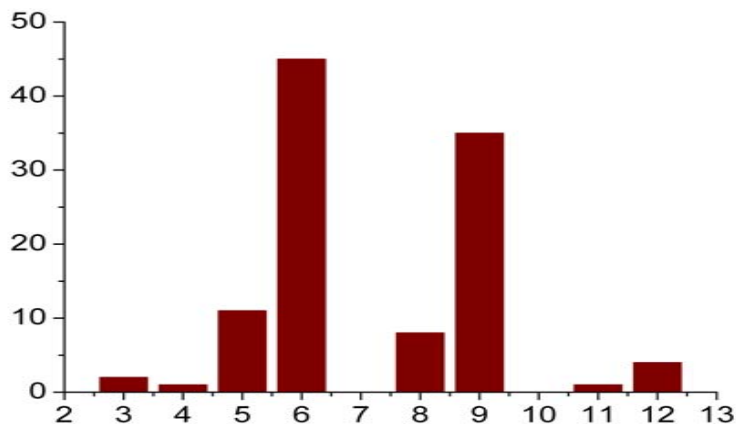


New Block and Gradient Copolymers by Controlled/Living Radical Polymerization

Krzysztof Matyjaszewski, Carnegie Mellon University, DMR-0090409

New star-block, graft and gradient copolymers were prepared by atom transfer radical polymerization (ATRP) and other controlled/living radical polymerizations in organic solvents and in aqueous systems.

■ *The first example is the synthesis of three-arm star-block copolymers consisting of polystyrene and poly(n-butyl acrylate). AFM shows aggregates mainly consisting of dimeric and trimeric species (6 and 9 arms per aggregate). However, some aggregates show lower number of arms, indicating defects in their molecular structures, which could affect properties.*



New Block and Gradient Copolymers by Controlled/Living Radical Polymerization

Krzysztof Matyjaszewski, Carnegie Mellon University, DMR-0090409

■ *The imperfections related to radical polymerization can be minimized using 3 arm stars, in comparison with ABA triblocks and AB diblocks. Thus, for 90% efficiency of crosspropagation, there will be 10 mol% of remaining macroinitiator but only 0.1 % for the tri-arm star.*

■ *This has been demonstrated using miniemulsion system (first star tri-arm block copolymers made in water!) using simultaneous normal and reverse initiation for ATRP (<1% of pMA core) macroinitiator, as shown in the 2-dimensional chromatography (SEC and LACCC).*

Acknowledgments:

-5 graduate students (Tsarevsky, Braunecker Jakubowski, Siegwart, Min), 3 postdocs (Chung, Han, Iovu) and 3 undergraduates (McKenzie, Lee, Wojtyna) contributed to this project.

